ESA-019, Boise Cascade International Falls Public Report

Introduction:

The steam system serving the Pulp and Paper Mill operations at the International Falls Plant consists of six steam generating units with a total output capacity in excess of 1.5 million pounds per hour (PPH) of steam. Steam is supplied at four header pressures, and is distributed to the various plant loads at three pressures.

Focus of Assessment:

The Plant Contact completed the Steam System Scoping Tool (SSST), and the completed tool was reviewed at the start of the Assessment. The Plant practices match well with the BestPractices. The SSST practices were utilized in subsequent meetings and discussions to identify potential conservation opportunities.

Approach for ESA:

The approach included the following:

1. Compiling energy consumption information
2. Meetings/interviews with steam system operations and management personnel
3. Surveys of existing facilities
4. Identification and analysis of energy conservation opportunities

General Observations of Potential Opportunities:

The cost of utility-supplied electricity to the plant is favorable due to the resource mix of the local utility. However, the plant has experienced the impact of natural gas cost increases and fluctuations that occurred in 2005.

Natural gas dominates the facility's annual energy cost.

Energy Conservation opportunities identified include the following.

Near Term

- Boiler efficiency testing and monitoring (SSAT Project to Change Boiler Efficiency)—

While the plant personnel collect and monitor data on multiple aspects of the operation of the steam and other process systems, boiler efficiency tests are not conducted on a scheduled basis, and steam production efficiency is not monitored in a real-time manner. However, efficiency estimates (by boiler) can be determined from existing process information that is collected and stored in the plant-wide instrumentation system. An empirical estimate of 1% to 3% reduction in gas use was applied, if the Best Practice for boiler efficiency testing and the development of "Boiler Efficiency Reports" is carried out.

Boiler 1 heat recovery (SSAT Project to Change Boiler Efficiency)—

The flue gas temperature down stream of the existing economizer is typically in the range of 450 to 500 F. It should be possible to operate satisfactorily with a stack gas temperature downstream of the economizer of 350 F. To model improved heat recovery for Boiler 1, an SSAT Version 2 model was developed assuming output from only Boiler 1. From available instrumentation data, the current boiler efficiency was estimated to be 80.5%; and, and using combustion tables, the expected efficiency with improved heat recovery was estimated to be 83.9%.

The mechanism required to achieve these savings is uncertain. Operators report that the stack gas temperatures leaving the economizer have increased in recent months—potentially indicating tube fouling. However, there was no ready explanation of an apparent source of the fouling. A pressure wash of the economizer tubes is planned for an upcoming maintenance outage.

The ESA did not include a survey of the existing conditions to develop a budgetary cost estimate for a replacement economizer, if needed. However, a highly preliminary estimate of $350,000 to $750,000 for a replacement economizer is offered as a first order estimate.

- Boiler 1 & 2 blow-down heat recovery (SSAT Project to Change Boiler Efficiency)—

Currently blow-down from these heavily utilized boilers is vented to atmosphere. Recovery to increase feedwater temperature or to send the condensed vapor to the deaerator should be considered. The SSAT Version 2 was used to model this opportunity by adding a Feedwater Heat Recovery Exchanger using Boiler blow-down. Estimated savings of annual natural gas fuel cost is $370,000. We did not survey the affected area for the purpose of estimating a project cost. However, the budget for this project may be less than $100,000.

- Change Condensate Recovery Rates—

System instrumentation indicates that the long term average condensate recovery rate is 41%. This value appears low; however, preliminary analysis by plant staff has not revealed any readily identifiable sources of loss. The SSAT Version 2 was used to demonstrate the reduction in cost if the 41% return rate can be improved to 50%. Water use would also be reduced. Chemical water treatment cost also will decrease. No budgetary estimate was assigned to this opportunity.

Water hammer from condensate flash—

It was reported by the operators that this occurs during specific events on one of the production machines. Efforts to correct this condition should be initiated, and would result in better control of steam supply to the process. This measure should be implemented to eliminate condition. The cost per hour of this situation is being analyzed. An estimate of the hours per year of occurrence of this condition has been requested from plant personnel.

Mid- and Long- Term

- Boiler 2 combustion air improvements—

This boiler is primarily fueled with tree bark. Various problems with the circulation of combustion air in the boiler have been observed. This is limiting the output of the boiler. Replacement/alteration of the induced draft, forced draft and combustion zone fans should be investigated to increase throughput and availability of the boiler. This would reduce the facility's reliance on natural gas. The use of variable speed drives on fans for this unit as well as others should also be investigated to reduce electricity consumption. An estimate of savings was not generated for this potential measure.

- Uses of turbine-generators—

The facility currently has 5 steam turbine-generators available to generate electricity. With the recent increases in natural gas prices, the turbines have been shut-down as a cost reduction measure. Analysis using the SSAT Version 2 during the field visit confirmed the appropriateness of the current practice. However, as natural gas prices fall, revised practices should be implemented to optimize the plant operation.

- Recovery Boiler—

A variety of other measures were discussed concerning operation of the Recovery Boiler. They are aimed at reducing maintenance outages and/or increased throughput to increase Black Liquor usage. These are in various stages of 'monitoring and evaluation' by plant personnel.

Savings of approximately 9% of natural gas consumption can be realized if the measures are found to be cost effective and implemented.

Management Support and Comments:

Management support for conservation initiatives is strong both at the local plant and corporate level. The 'Energy Team' at the facility has membership from a cross section of organizational entities, and has the attention and support of the Mill Manager.

DOE Contact at Plant/Company: Same as corporate Lead.